

REMARKS

Upon entry of this amendment, claims 1 - 4, 6 - 8 and 10 -12 are all the claims pending in the application. Claims 5 and 9 have been canceled by this or a previous amendment. Claims 1 - 3, 6, 8 and 10 have been amended. Claim 12 has been added as a new claim. No new matter has been added. In view of the above amendments and the following remarks, reconsideration and further examination are requested.

Applicants note that a number of editorial amendments have been made to the specification and abstract for grammatical and general readability purposes. No new matter has been added.

Applicants note that claims 1 - 3 and 6 have been amended for improved clarity and general readability purposes. Such amendments do not narrow the scope of the claims and are not made in response to any prior art or other rejection.

Objection to the Drawings

The Examiner has objected to the drawings for the reasons set forth on page 2 of the Office Action. In particular, the Examiner asserts that only that which is old is illustrated. Applicants are submitting herewith a replacement sheet for Figure 14, which adds the label -- Prior Art--. No new matter has been added.

Accordingly, Applicants kindly request that the objection be reconsidered and withdrawn.

Objection to the Claims

Claims 1, 2 and 9 have been objected to for the reasons set forth on pages 2 and 3 of the Office Action. In particular, the Examiner suggested the following:

Claim 1,

line 6: change “IDT” to --interdigital transducer-- or

line 3: add --(IDT)--;

lines 9 - 10: change “the interdigital transducer electrode” to --the one or more interdigital transducer electrodes--;

line 12: change “connection wirings” to --connecting wirings--;

Claim 2,

lines 2 - 3: change “the interdigital transducer electrode” to --the one or more interdigital transducer electrodes--; and

Claim 9,

last line: add --propagation path-- after “first surface acoustic wave”.

Applicants have made the following changes.

Claim 1,

line 6: changed “IDT” to --at least four interdigital transducer electrodes--;

lines 9 - 10: changed “the interdigital transducer electrode” to --the at least four interdigital transducer electrodes--;

line 12: changed “connection wirings” to --connecting wirings--;

Claim 2,

lines 2 - 3: changed “the interdigital transducer electrode” to --the at least four interdigital transducer electrodes--; and

Claim 9 has been cancelled. Therefore, the objection is deemed to be moot.

Accordingly, Applicants have amended claims 1 and 2 in a manner to overcome the Examiner's objections. Applicants respectfully request that the objections to the claims be reconsidered and withdrawn.

Claim Rejections under 35 U.S.C. § 112, second paragraph

Claim 9 has been rejected under 35 U.S.C. § 112, second paragraph as being indefinite. In particular, on page 3 of the Office Action, the Examiner asserted that "the surface acoustic wave resonator" lacks sufficient antecedent basis and it is unclear as to which of SAW resonators that form the filter in claim 9 refers.

However, in view of the cancellation of claim 9, the rejection is deemed moot. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Claim Rejections under 35 U.S.C. § 102

Claims 1, 2, 4 and 8 - 10 have been rejected under 35 U.S.C. § 102(b) as being anticipated by JP 8-265099 to Morimoto (cited by Applicants) and claims 1 - 4, 8, 10 and 11 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Pat. No. 5,486,800 to Davenport.

Applicants respectfully traverse these rejections on the following basis. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). In the present case, each

and every element of the rejected claims is not either expressly or inherently described in the Morimoto reference for the following reasons.

Claim 1, recites a combination of elements, *inter alia*:

“A surface acoustic wave filter, comprising:

a first electrode pattern having at least four interdigital transducer electrodes and at least one inner reflector electrode arranged...on a first surface acoustic wave propagation path;

reflector electrodes arranged at least at both ends of the first electrode pattern formed including the at least four interdigital electrodes;

a second electrode pattern having a plurality of interdigital transducer electrodes arranged on...a second surface acoustic wave propagation path; and

reflector electrodes arranged at least at both ends of the second electrode pattern formed including the at least four interdigital transducer electrodes,

wherein the at least four interdigital transducer electrodes...are electrically connected in series..., and

each of the plurality of interdigital transducer electrodes...is connected between the connecting wirings and ground, and

the connecting wirings are arranged between the first electrode pattern and the second electrode pattern, and

wherein the at least one inner reflector electrode has a fewer number of electrode fingers than the reflector electrodes arranged at both ends of the first electrode pattern, and at least one adjacent pair of the interdigital transducer electrodes of the first electrode pattern has no reflector electrode therebetween.” [Emphasis added]

The present invention solves conventional problems such as increasing the number of surface acoustic resonators in order to increase out-of-band attenuation in the structure, thereby increasing the chip size. Accordingly, an object thereof is to provide a SAW filter that can be miniaturized while having a high attenuation characteristic.

The Morimoto reference discloses a surface acoustic wave filter of a resonator type. In Figures 1 and 4 of Morimoto, a filter 20 has two blind-like electrodes (asserted to be IDT electrodes by the Examiner) 11a wherein at each end is provided one of a 1st, 2nd, or shared grating antenna reflector (asserted to be reflector electrodes by the Examiner) 11b, 11c, 11g on one propagation path and has one of a 1st or 2nd grating antenna reflector at each end of a blind-like electrode 11a on another propagation path. In other words, one propagation path has the following order of electrodes: RE-IDT-RE-IDT-RE and the other propagation path has the following order of electrodes: RE-IDT-RE. Therefore, Morimoto merely discloses a structure which has IDT electrodes at both ends of which are provided reflector electrodes. There is no disclosure of a structure that has “at least one inner reflector electrode has a fewer number of electrode fingers than the reflector electrodes arranged at both ends” and “at least one adjacent pair of the interdigital transducer electrodes has no reflector electrode therebetween” as recited in amended claim 1.

The Davenport reference discloses a surface acoustic wave device. In Figure 6 of Davenport, four series IDT electrodes 602, 604, 606 and 608 and two end reflector electrodes 620 and 626 are arranged on one propagation path, and three series IDT electrodes 610, 612 and 614 and two end electrodes 622 and 624 are arranged on another propagation path. In other words, one propagation path has the following order of electrodes: RE-IDT-IDT-IDT-IDT-RE and the other propagation path has the following order of electrodes: RE-IDT-IDT-IDT-RE.

Therefore, Davenport merely discloses a structure which has IDT electrodes connected in series. There is no disclosure of a structure that has “at least one inner reflector electrode has a fewer number of electrode fingers than the reflector electrodes arranged at both ends” and “at least one adjacent pair of the interdigital transducer electrodes has no reflector electrode therebetween” as recited in amended claim 1.

In contrast as shown at least in Figure 4 of the present application, one propagation path has the following order of electrodes: RE-IDT-RE-IDT-IDT-RE-IDT-RE and the other propagation path has the following order of electrodes: RE-IDT-IDT-RE. Further, as shown at least in Figure 10 of the present application, one propagation path has the following order of electrodes: RE-IDT-IDT-RE-IDT-IDT-RE and the other propagation path has the following order of electrodes: RE-IDT-RE-IDT-RE. In other words, adjacent IDT electrodes do not have a reflector electrode arranged therebetween. More simply, a reflector electrode is arranged at least at one space between IDT electrodes, but there is no reflector electrode arranged at other spaces between adjacent IDT electrodes of a first SAW propagation path. As such, amended independent claim 1 recites “wherein the at least one inner reflector electrode has a fewer number of electrode fingers than the reflector electrodes arranged at both ends of the first electrode pattern, and at least one adjacent pair of the interdigital transducer electrodes of the first electrode pattern has no reflector electrode therebetween.”

Accordingly, as neither Morimoto nor Davenport teach each and every element of independent claim 1, namely, at least those features emphasized in the above paragraph, Applicants respectfully submit that both of these reference fail to anticipate this claim. Accordingly, Applicants respectfully request that the rejections under 35 U.S.C. 102(b) be withdrawn.

Claims 2 - 4, 8, 10 and 11 depend from claim 1 and are therefore considered patentable at least by virtue of their dependency.

The rejection of claim 9 is deemed moot in view of the cancellation of the claim.

Claim Rejections under 35 U.S.C. § 103(a)

Claim 6 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Morimoto in view of JP 2002-016470 to Wu (cited by Applicants); and claim 7 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Morimoto in view of U.S. Pat. No. 5,638,036 to Penunuri et al.

Applicants respectfully traverse these rejections on the following basis. To establish a *prima facie* case of obviousness, three basic criteria must be met. *KSR*, 550 U.S. at ___, 82 USPQ2d at 1391 reaffirmed the familiar framework for determining obviousness as set forth in *Graham v. John Deere Co.* (383 U.S. 1, 148 USPQ 459 (1966)), but stated, when considering obviousness of a combination of known elements, the operative question is thus "whether the improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at ___, 82 USPQ2d at 1396. Therefore, a claim is obvious only if (A) one of ordinary skill in the art could have combined the claimed elements by known methods; (B) the elements in combination merely perform the function that each element performs separately; or (C) the results of the claimed combination are expected.

In the present case, (A) one of ordinary skill in the art could not have combined the claimed elements by known methods; (B) the elements in combination do not merely perform the function that each element performs separately; or (C) the results of the claimed combination are not expected as described in the Wu and Penunuri et al. references for the following reasons.

Morimoto has been discussed above. The Examiner cited Wu and Penunuri et al. in an attempt to cure the deficiencies of Morimoto regarding claims 6 and 7.

Claims 6 and 7 depend from claim 1. Wu teaches a resonator type surface acoustic wave filter. However, neither a structure which has plural IDT electrodes on the same SAW propagation path nor a shared reflector electrode is discussed. Penunuri et al. teaches an acoustic wave ladder filter with unequal series and shunt transducer periodicities and a method of making. However, the reflector electrodes are disposed at both ends of the IDT electrodes, similar to Morimoto.

Accordingly, Applicants submit that both Wu and Penunuri et al. fail to cure the deficiencies of Morimoto as discussed above, with respect to claim 1. Further, Applicants submit that claims 6 and 7 are patentable at least by virtue of their dependency.

Therefore, Applicants respectfully request that the rejections under 35 U.S.C. 103(a) be withdrawn.

New Claims

Claim 12 has been added as a new claim. Claim 12 depends from claim 1 and is therefore considered patentable at least by virtue of its dependency. Support for the newly added claim 12 can be found for example in Figures 11 and 12 and in dependent claims 4, 8, 10 and 11.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may best be resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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